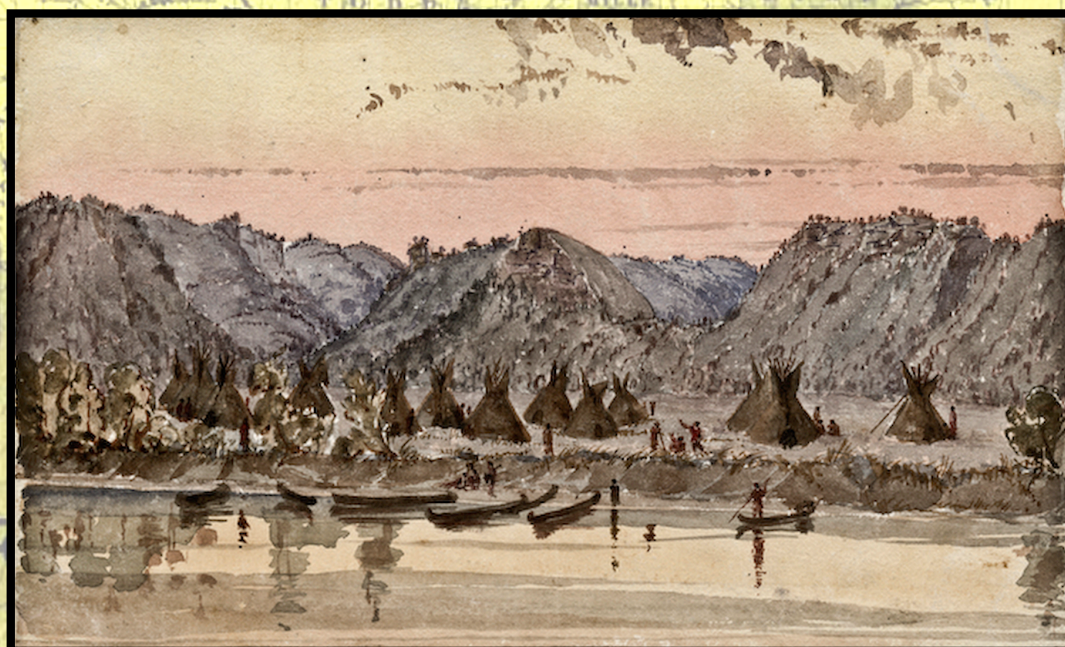


# MARITIME HERITAGE MINNESOTA



Ann Merriman  
Christopher Olson

## Minnesota Dugout Canoe Project Report



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## Acknowledgments

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Cover: Wah-ba-sha Village on the Mississippi River 650 Miles above St. Louis. Some of the canoes depicted here are probably dugout canoes. Watercolor by Seth Eastman around 1845 (Minnesota Historical Society, AV1991.85.19).



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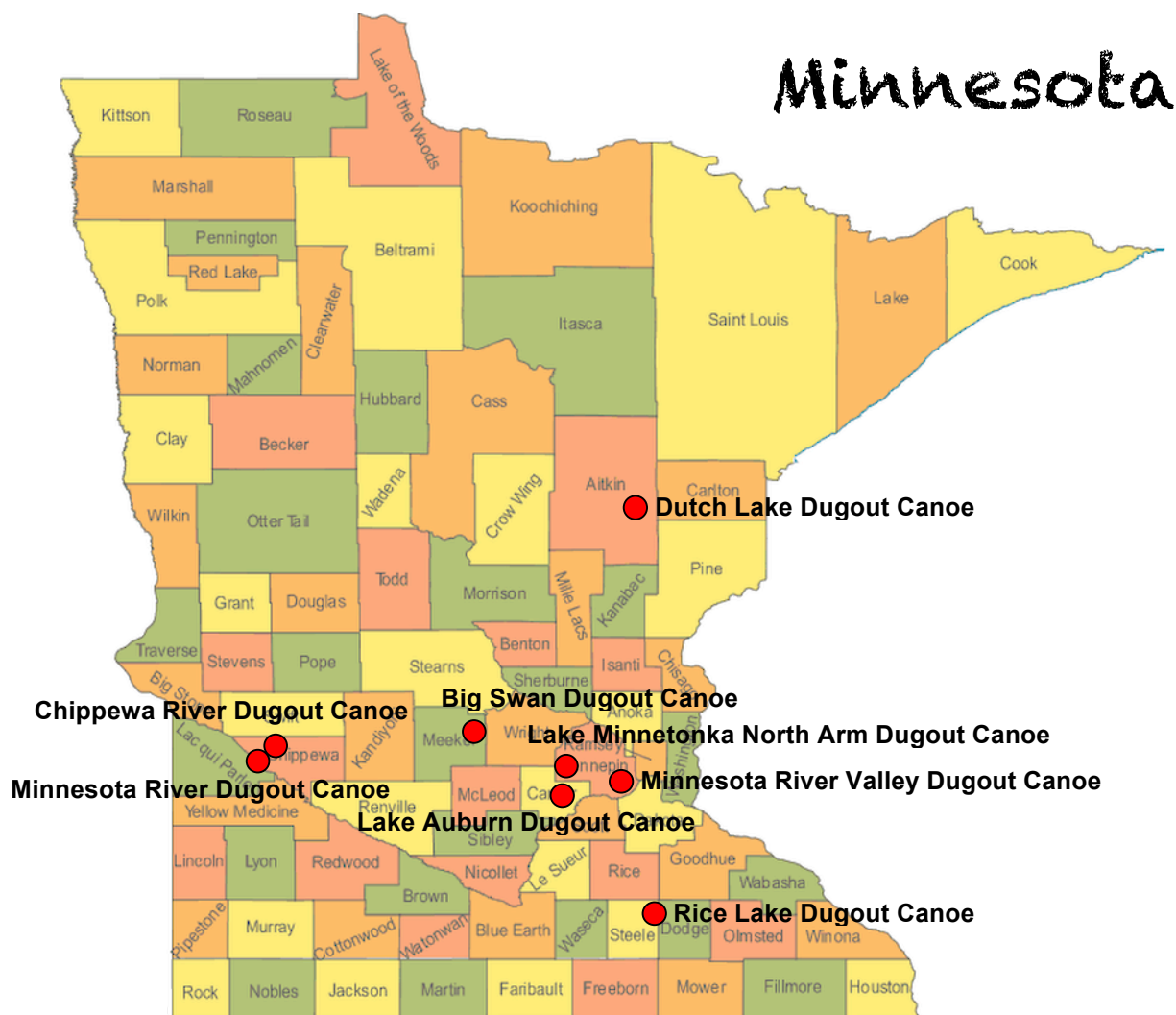
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## Introduction

Maritime Heritage Minnesota (MHM) recognized a gap in Minnesota's maritime history and nautical archaeological knowledge during the Lake Minnetonka Survey 2 (LMS-2) Project. In early May 2012, an anomaly (designated 118) recorded by the side-imaging sonar unit appeared to be a dugout canoe resting on the bottom of the West Upper Lake section of Lake Minnetonka. In early June 2013, MHM dove on the anomaly during the Lake Minnetonka Nautical Archaeology 1 (LMNA-1) Project and determined Anomaly 118 is comprised of two lines of stones. However, during the research portion of the LMS-2 Project, MHM located photographic images of a dugout canoe removed from Lake Minnetonka's North Arm in 1934 during low water conditions. During the research phase of the LMNA-1 Project, MHM located the 'North Arm canoe' on exhibit at the Western Hennepin County Pioneers Association in Long Lake. At that time, MHM took photographs of the artifact and began formulating a research design to study that canoe and any others located in the State of Minnesota.



The lakes and rivers where the dugout canoes documented during this project were found and removed.



## Research Design and Methodology

The Minnesota Dugout Canoe (MDC) Project was designed from information gathered at the Office of the State Archaeologist (OSA) and the Minnesota Historical Society (MNHS). MHM located eight dugout canoes in Minnesota museums or historical societies and received permission from those institutions to document them. Seven of the eight artifacts had not undergone radiocarbon testing and MHM received permission to take small wood samples from the canoes for dating purposes. MHM measured, photographed, and conducted condition assessments on each artifact, analyzed accession data, searched newspapers for pertinent information, and consulted historical accounts of Native American dugout canoe use. The wood samples for radiocarbon dating were appropriately packaged and sent to the Beta Analytic lab in Florida for analysis.

## Dugout Canoe Use in Minnesota and Wisconsin

With no supporting artifacts associated with any of the dugout canoes studied during the MDC Project, MHM must depend on historical sources for context. Descriptions of dugout canoes constructed and used by Native American tribes and Europeans exist from 1835 to the early 1850s in the form of travel diaries, one of which was written in French and Italian, and in watercolor paintings and pencil sketches by artist Captain Seth Eastman. In 1834, George W. Featherstonhaugh traveled by steamer, train, horse, and canoe from the East Coast to the source of the 'Minnay Sotor', or St. Peter's River. In 1835, on his way back east, Featherstonhaugh spent time in Wisconsin and complained about his lake travels in a dugout canoe. As he described it, it "was a wretched, tottering affair, imperfectly hollowed out of a small log, and wobbled about in such a doubtful manner that we had been several times near upsetting in crossing the lake. In this 'dug-out'...I had taken my seat on the bottom near the prow, with my face towards the stern, holding the sides with my hands" (Featherstonhaugh 1847, 102).

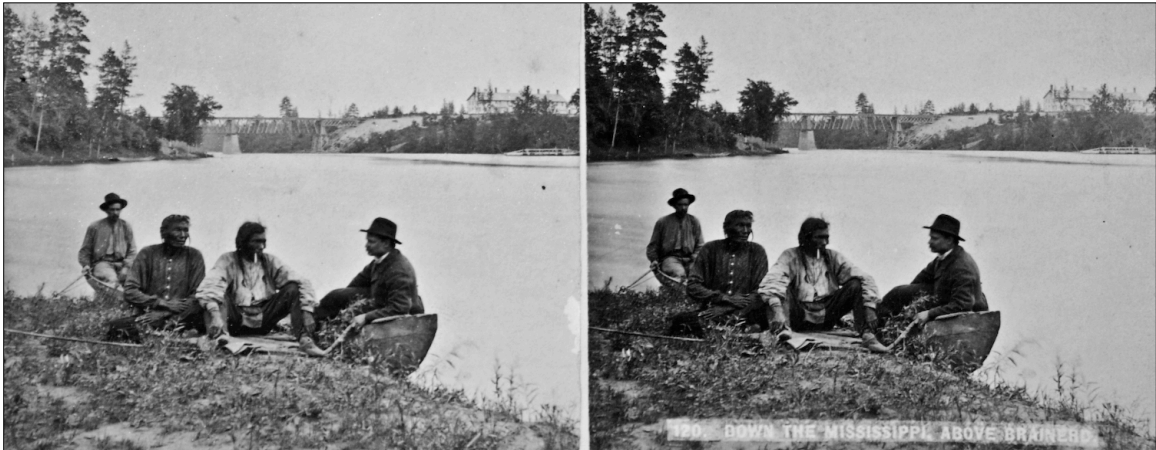


A rare depiction of a mid-19<sup>th</sup> Century Minnesota dugout canoe by Seth Eastman (Schoolcraft 1852, Pl. 72.5, digitized by MHM).

Another first-hand account of dugout use in comes from Count Francesco Arese who traveled Minnesota's waterways during 1837. At Traverse des Sioux on the Minnesota River, known to Arese as the St. Pierre River, he traded his horse to two Native Americans for what he described as a "small boat". However, this small boat is also characterized as a "canoe", but it probably was not a dugout canoe because Arese provided a detailed account of the next watercraft he used in Minnesota. He took to the Mississippi River at the confluence with the Minnesota River in a dugout with two



Canadians. Arese described their craft as "a wooden one made of a tree trunk. It was 30 or 35 feet long and from 1/2 to 2 broad. When I was sitting on the bottom of it...I had a hard time moving, for the great trouble with such canoes is that they are very unsteady and a fairly heavy wave fills them at once. A person not accustomed to them hardly dares to move; but in a short while you learn to turn in every direction without making them lose their balance". Arese also traveled through Wisconsin, buying passage with a Native American family in their 24-foot long birch bark canoe. Arese contended that he found "that type of canoe far preferable to the wooden ones, because they are more comfortable to sit in, it is easier to move about, they are less tippy, and being infinitely lighter than the others, they always float on top of the waves and consequently never ship water. And...they go faster than the others. There one bad point is that the least blow tears them...you have to disembark when the water is extremely shallow, to keep them from rubbing along the bottom (Arese 1934, 110, 118, 129, 146).

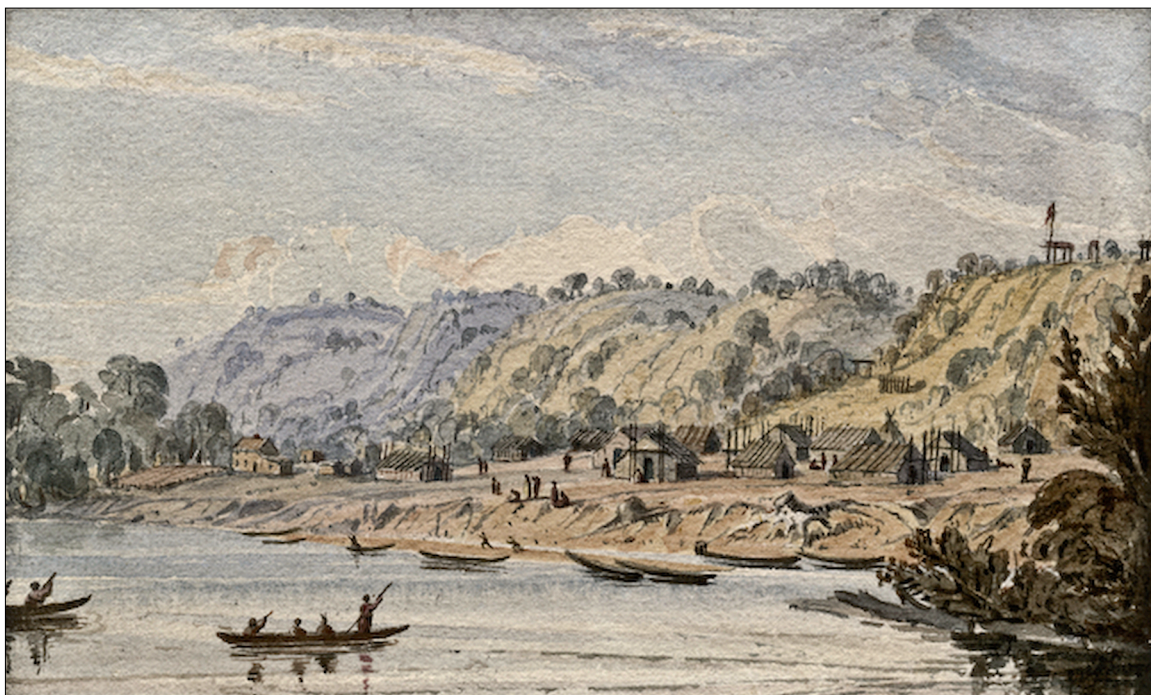


Native Americans in a dugout canoe with a traveler on the Mississippi River above Brainerd around 1880 (MNHS, E97.35r79, digitized by MHM).



An Ojibwa family with their birch bark canoe in the early 20<sup>th</sup> Century (MNHS, E97.35r5, digitized by MHM).





Little Crow's Village on the Mississippi. MHM contends the majority of the canoes depicted here are dugouts due to the lack of sharply upturned ends shown. Watercolor by Seth Eastman (MNHS, AV1991.85.33).

In the early 1850s, a description of Native American canoe-making was discussed within the context of their creation as art. The process of birch bark canoe construction was detailed step by step, and the people who made them were described as skilled with good taste. To contrast, dugout canoes were given hardly a mention and were characterized as "ordinary...made from the entire trunk". The ability to create elegant lightweight structures such as birch bark canoes was attributed only to the Algonquian tribes of the north and east, whereas the construction of dugout canoes was assigned only to the "southerly and westerly tribes" (Schoolcraft 1852, 511-513, Pl. 72.5). This assertion is incorrect, since birch bark canoe making was known to the southern Minnesota tribes by the 1830s (see Arese above) and probably earlier, with dugout canoe construction simply being an older tradition of craft-building or utilized by less-skilled craftsmen. However, birch bark canoes were utilized by northern tribes and French traders in Minnesota and Canada by the late 1600s (Wheeler et al 1975, 2-4).

The construction of an Ojibwa birch bark canoe around 1895 (MNHS, E97.35.p18).





Santee Dakota physician and author Charles Eastman (Ohiyesa) contended that Native Americans constructed dugout canoes when birch bark was not readily available. A suitable tree to fell would be chosen carefully, with soft maple, basswood, and cottonwood being the most appropriate to create a craft 12-16 feet long. During the prehistoric period the bulk of the inside of the trunk would be burned out to remove the majority of the wood and then finished with stone tools. The outside of the hull would have been smoothed with bone knives or sharp shells. With the introduction of metal tools in the historic period, the tree trunk would be smoothed on the outside into a boat shape and athwartships cuts were made about one foot apart down the length of the log. The wood between these cuts would be split longitudinally and removed, and then hollowed out more with a pickaxe and smoothed by a chisel. Eastman described the thickness of the dugout canoes hull to be four to six inches and determined that knives smoothed the outer hull. Although not mandatory, fire was sometimes used to dry the hull and polish it. Eastman held that many Native Americans preferred dugouts to birch bark canoes because they believed them to be faster, more durable, and in the historic period they were easier to make due to the availability of better tools. Eastman believed that "the forest Indian alone still clung to the bark canoe". Finally, Eastman stressed one aspect of using dugout canoes – they were not intended for use by the novice. He contended dugouts were "very graceful in the hands of an expert Indian canoeist" (Eastman 1914, 49-51). This facet of craft handling might explain the derision that Featherstonhaugh and Arese held for their dugout canoe transportation, particularly when it was handled by Canadians.



Felling and hollowing out tree trunks using fire was the most efficient way to produce dugout canoes during America's prehistoric period. The depiction above is the iconic image that represents the construction of dugout canoes (Theodor de Bry in *Admiranda narratio fida tamen, de commodis et incolarum ritibus Virginiae*, Pl. XII, 1590).

## A Sampling of American Dugout Canoes in Archaeological Contexts

Native American cultures from several American states have produced dugout canoes that have survived in archaeological contexts. A brief overview of finds in Florida, North Carolina, Wisconsin, and South Carolina provides a comparison within which to place Minnesota's dugout canoes.

### Florida

In 2000 an incredible find of 101 submerged dugout canoes in Newnans Lake in Florida, east of Gainesville, by local residents represents what nautical archaeologists consider the perfect site and circumstances. During drought conditions similar to those experienced in 1930s Minnesota, the water of Newnans Lake receded to extreme lows. Upon coming across some "flat straight pieces of wood embedded in the sand", they contacted the Florida Office of the State Archaeologist (FOSA) in Tallahassee. State archaeologists and a team from the Florida Museum of Natural History conducted a several months-long excavation project, documenting "the largest known find of ancient watercraft in the world". At the core of this successful project was the first correct action of notifying the FOSA immediately of the existence of possible artifacts in the lake by the concerned residents near Newnans Lake. This first significant move guaranteed the artifacts were assessed *in situ* by trained professionals for the maximum amount of information retrieval with minimal disturbance. This was extremely fortunate, for while the combination of fresh water and mud provided for a remarkable state of preservation of the canoes, this was only true if they were not removed from the lake. As happens over time with shallow water areas, repeated droughts exposed the waterlogged wooden canoes to air and when this occurred, the wood's cells shrank repeatedly resulting in permanent collapse. The archaeologists found that they could not safely remove any of the Newnans Lake dugout canoes. Because of this, their implemented research design centered on documentation *in situ* and wood sample collection from 50 of the artifacts. The radiocarbon dates of the sampled canoes range from 500 to 5,000 years old, indicating this site was used for several millennia as a dugout canoe resting place, and a comparison of the canoe's attributes points to a 5,000 year old maritime tradition of watercraft construction that did not change. The Florida archaeologist have supposed the site is a 'graveyard', the canoes may have been blown to this shoreline over thousands of years, it may represent a dugout canoe manufacturing place, or a combination of these scenarios (Tonnessen 2010, 68-69).

Since the significant maritime historical discovery in 2000, other dugout canoes have been located in Florida as a result of continued drought conditions. In May 2012 a teenager found a dugout canoe at Putnam Hall, northeast of Newnans Lake and Gainesville, in a dry lakebed. Archaeologists were called to the site and located an additional dugout near-by. The artifacts remained *in situ* but were thoroughly documented (Crabbe 2012). In September 2013, another dugout canoe was located by divers on SCUBA in eight feet of water in Lake Owen southeast of Gainesville and south of the Ocala National Forest. The finders of the canoe, a seven year-old and his grandfather, uncovered the artifact and hauled it ashore, and then informed authorities. Reportedly the canoe is apparently drying out in controlled conditions, but without being



properly conserved using a substance such as polyethylene glycol (PEG)<sup>1</sup>, the artifact will continue to deteriorate. Once dried out, it will be put on display at the Marion County Museum of History and Archaeology, 'donated' by the finders (Medina 2013). However, the finders had no legal right to do so since the lake bottom is State land and the canoe should have been reported to the FOSA. Trained archaeologists would have written a proper archaeological research design and documented the dugout *in situ*. Further, significant conservation treatment funds should have been obtained before the canoe was moved from the lake.

### **North Carolina**

By 1985 less than 10 dugout canoes were known to exist in North Carolina. In that year, Lake Phelps in Washington County was used as a source of water to fight fires. This action significantly lowered the lake's level and prehistoric artifacts were exposed. In November, staff from Pettigrew State Park (PSP) located a dugout canoe and staff from the North Carolina Underwater Archaeology Unit (NCUAU) excavated the artifact and transported it for conservation to their lab. In 1986, staff from the NCUAU and PSP, personnel from the North Carolina Office of the State Archaeologist (NCOSA), and an MA candidate's research team from East Carolina University (ECU) conducted various surveys, excavations, and investigations at Lake Phelps. During these projects, an additional 22 dugout canoes were discovered along with associated artifacts. Nineteen of the 23 canoes were radiocarbon tested and the oldest canoe dated to 2430 BCE and the newest to AD 1400 (Pierce 2010, 29, 31-32, 35-36, 45, 47).

### **Wisconsin**

A few known dugout canoes have been located in Wisconsin and a success story comes from Lake Mary near Kenosha. A 12 year-old girl and her grandmother discovered the dugout in 1996 and immediately contacted nautical archaeologists with the Wisconsin Historical Society (WHS). The canoe was radiocarbon dated and was found to be 2,000 years old, the oldest watercraft in the State. It was properly documented, excavated, and conserved by the WHS and put on exhibit at the Kenosha Public Museum (Wisconsin Historical Society nd). Another success story comes from a marsh on the land of a cranberry grower who left the dugout canoe he found *in situ* and contacted the WHS. The 150 year old "Cranberry Canoe" was properly documented, excavated, conserved, and is now on exhibit at the Wisconsin Cranberry Discovery Center in Warren (Wisconsin Cranberry Discovery Center nd). MHM commends the finders of these artifacts for contacting the WHS promptly.

### **South Carolina**

South Carolina has a number of documented dugout canoes from a variety of contexts. One of the most interesting has been used as a decorative object on a family's lawn on Pawley's Island near the Waccamaw River. This double-ended craft was found buried on Myrtle Beach and was moved to its current location. The uniqueness of this historic period canoe lies in the presence of a mast step and a stern configuration that suggests it carried a steering oar (Harris 2002, 4-5). Since a sailing vessel would require a steering apparatus, this supposition makes sense.

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<sup>1</sup>PEG is the standard treatment for the conservation of waterlogged wooden artifacts from archaeological contexts that are not composites, meaning they are strictly comprised of wood and not a combination of wood and metal.

## **Radiocarbon Dating of Dugout Canoes**

During the documentation of the dugouts studied for the MDC Project, MHM collected wood samples from seven of the eight canoes for radiocarbon testing; the eighth canoe had previously been tested. MHM used a small drill bit to create a hole 1/4 inch deep into the hull of each canoe and then used a smaller drill bit to deepen the hole into the wood. This way, the small bit would produce wood shavings clear of contaminants. Each sample collected was less than 100 mg in size and underwent Accelerated Mass Spectrometry radiocarbon dating tests at Beta Analytic Radiocarbon Dating Laboratory of Miami, FL. The results were presented to MHM on data sheets that listed the canoe's 'Conventional Radiocarbon Age' (CRA) in the form of a 'number of years  $\pm$  a number of years BP' (Before Present). In this context, 'Present' is the year 1950. Also provided were a range of '2 Sigma calibrated results' in the form of ranges of calendar dates that indicate the probability that a date range is the correct age of the sample. The 2 Sigma results provided by the lab used the 2009 calibration database to calculate the calendar date range probabilities. MHM re-calibrated the CRA data using the 2013 calibration database provided online by Oxford University (OxCal). The calibrated calendar dates provided below represent the date range that have the highest probability of being correct within the technology available.

### **Results of the Minnesota Dugout Canoe Project**

Presented here are the histories, descriptions, and radiocarbon dating results of the eight dugout canoes documented during the MDC Project. They are ordered chronologically from oldest to youngest.

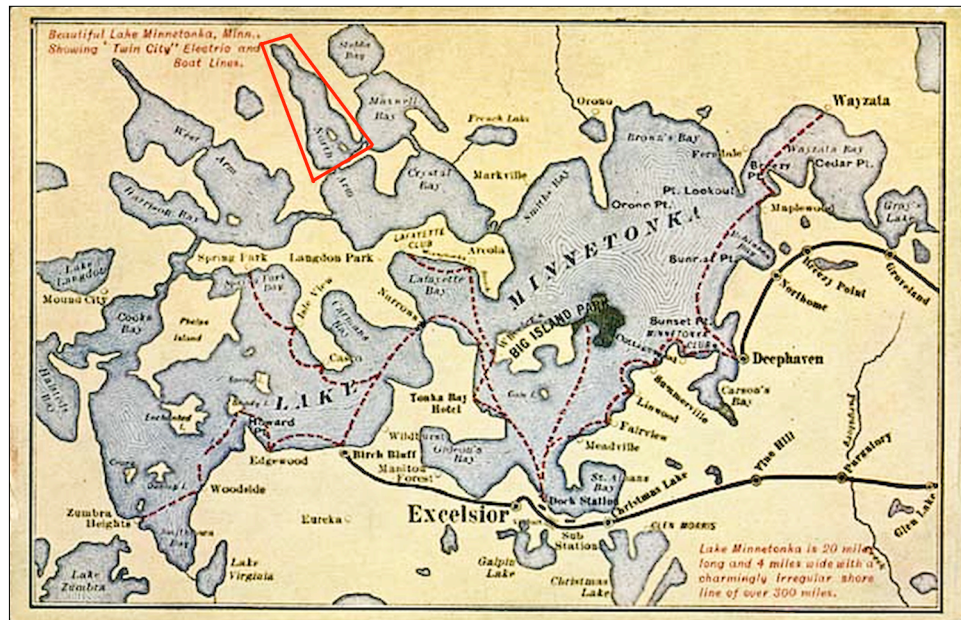
#### **1. Lake Minnetonka North Arm Dugout Canoe (21-HE-438)**

##### **Western Hennepin County Pioneers Association, Long Lake**

During low water conditions due to a severe drought on late August 1934 Helmer Gunnarson and his brother Arthur, sons of Gustave A. Gunnarson, discovered the Lake Minnetonka North Arm Dugout Canoe (LMNADC) in Orono, Hennepin County. Throughout the summer, the Gunnarson family had to construct extensions to their dock as the water continually receded from the normal shoreline. At that time the lake level was just over seven feet below its ordinary high water level. Helmer and Arthur had sunk several dock pilings but one hit an obstruction 10-12 inches below the silt. Thinking they had hit a log, they exposed the object and dragged it onto the shoreline where they determined it was a dugout canoe. Helmer and Arthur observed that the canoe "had been maintained in an excellent state of preservation as a result of having been imbedded in earth and completely covered by several feet of water over an extended period of time". The Gunnarsons attempted to have the LMNADC examined by representatives of the University of Minnesota (UM) and the MNHS, but in the end they gave the LMNADC to the Minnesota Archaeological Society (MAS). As a courtesy, the society offered the elder Mr. Gunnarson an honorary membership in the MAS. At the MAS October meeting, the LMNADC was the "main subject for discussion". The society loaned the artifact for exhibit to the Minneapolis Institute of Arts in late 1934, the LMNADC was shown in the MAS display within the Walker Art Gallery thereafter, and it was on exhibit at the Minneapolis Public Library until 1961. The Western Hennepin County Pioneer Association (WHCPA) acquired the LMNADC in 1961 from the MAS.



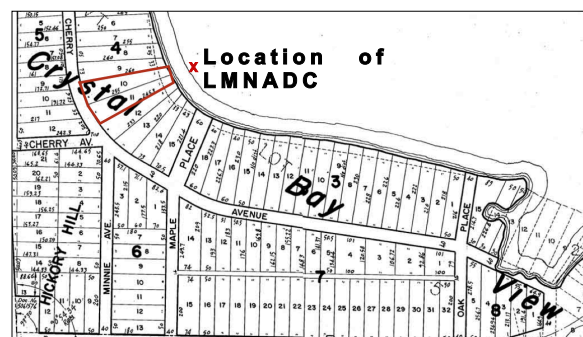
(Gunnarson and Gunnarson 1966; McSchannock 1988; Minneapolis Institute of Arts 1934, 1; Minnehaha Watershed District 2014; Morrow 2001, 5-6; Sackett 1936, 8; *Weekly Valley Herald* 1934).



Lake Minnetonka in Hennepin and Carver Counties. The North Arm is marked in red (Postcard).



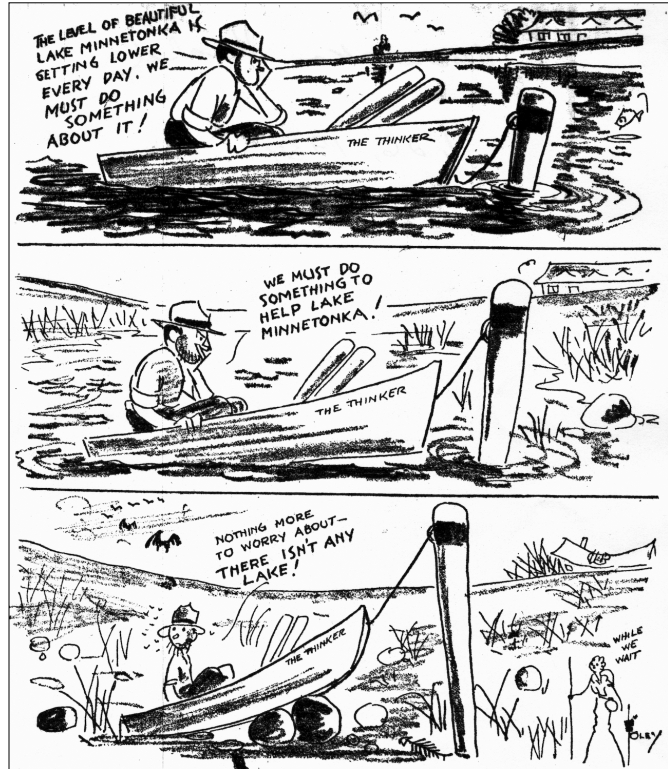
This aerial photograph of North Arm was taken on 12 September 1937. Lake Minnetonka levels were at historic lows in 1934 and 1937. Note the receded water (John R. Borchert Map Library).



Gustave A. Gunnarson purchased lots 10 and 11 of block 4 of the Crystal Bay View section on North Arm on 15 August 1906 for \$500.00 (Hennepin County Deed, 443908; Plat System Services 1961).



Lake Minnetonka's water level was a major topic of discussion during the Spring, Summer, and Autumn of 1934. Every week local newspapers reported the continually falling level and criticism of decisions by governmental officials abounded. The cartoon to the right typifies the attitudes of many Lake Minnetonka residents (*Minnetonka Herald* 1934).



Helmer and Gustave Gunnarson removing the Lake Minnetonka North Arm Dugout Canoe from the water in front of their cabin in August 1934. The artifact was located near the end of the Gunnarson family dock about 90 feet from the shoreline because of receding water caused by a severe drought. In normal conditions, the canoe would have been under several feet of water (MNHS, HE5.19p17, digitized by MHM).



MHM documented the LMNADC at the WHCPA on 4 January 2014. In its current condition the artifact is 11.1 feet long, 1.4 feet wide, and its depth of hold is .55 feet deep. The artifact's sides have deteriorated and the original height of the vessel to its gunwales is unknown. When the canoe initially left Lake Minnetonka, the ends were more intact when compared to its current condition. Using the photographic evidence as a guide, at least one end of the LMNADC was pointed. The bottom of the craft has a large crack extending along its entire length, splitting it in two from amidships to one end. This crack did not exist in 1934. The wood is dry and checked, with many loose pieces lying inside the hull; MHM gathered several of these small pieces for wood typing. MHM suggests the artifact be placed into an environment with controlled humidity. The wood sample taken by MHM has a calendar age of AD 1025-1165 (930 $\pm$ 30 BP), indicating the artifact was made by people of the Woodland Culture and dates to the Final Late Woodland Period (Gibbon 2012, 145). MHM submitted an archaeological site form to the OSA in mid-March 2014 and received a site number (21-HE-438) for the LMNADC's original location at that time.



The Lake Minnetonka West Arm Dugout Canoe on exhibit at the Western Hennepin County Pioneers Association (MHM).



Above: One end of the LMWADC clearly shows human fashioning of the tree trunk (MHM).



Right: The wood sample from the LMWADC prepared for radiocarbon testing (Beta Analytic).



## 2. Big Swan Dugout Canoe (21-ME-37) McLeod County Historical Society 88.2266, Hutchinson

Minnesota Department of Conservation, Fish and Game Division workers snagged the Big Swan Dugout Canoe (BSDC) while seining for carp in Big Swan Lake in Meeker County sometime between mid-December 1957 to mid-January 1958. The artifact was transferred to the McCleod County Historical Society (MCHS) where it has been housed since January 1958. In 2003 the BSDC was given a site number, 21-ME-37, during a survey of Native American artifacts found throughout the state (*Hutchinson Leader* 1958; *The Independent Review* 1958; Kotila 2012; Munter 2003). The acquisition of the site number was possible because the State workers recorded the artifact's exact location on the bottom of the lake when it was removed. In 2012 the MCHS had a radiocarbon test conducted on a sample of BSDC's wood and it has a calendar age of AD 1039-1210<sup>2</sup> (900±30 BP).



Left: The Big Swan Dugout Canoe site is marked by the red X (US Geologic Survey [USGS] 1982).  
Right: The Big Swan Dugout Canoe as it looked just after it was removed from the Meeker County lake (*The Independent Review* 1958).

MHM documented the BSDC on 22 December 2013. The artifact is 14.25 feet long, 1.95 feet wide, has a .6-foot depth of hold amidships, and the canoe's sides are mostly deteriorated. The outer hull of the BSDC is rough, with numerous knots from the source tree still visible. This attribute may indicate that the canoe was hastily constructed since

<sup>2</sup>The calibrated 2 Sigma calendar age for the BSDC was calculated to be AD 1030-1220 in 2010. However, MHM re-calibrated the data using the 2013 standard to refine the date to AD 1039-1210.



the builder did not spend time to fashion a sleek hull that would move more efficiently through the water; the builder might have been short on time and needed a watercraft quickly. Both ends appear to have been carved to points but their original configuration cannot be determined. The artifact is in need of stabilization since it is severely checked and its fragmentation is on-going. Further, a large section at one end of the canoe has broken off and has not been re-attached properly. The artifact is not stored in a controlled environment and is on the museum's floor where people can sit down or step on it. MHM contends the artifact was made by people of the Woodland Culture and dates to the Final Late Woodland Period (Gibbon 2012, 145).



The Big Swan Dugout Canoe on exhibit at the McCleod County Historical Society (MHM).



These two views of one end of the Big Swan Dugout Canoe illustrate the rounded nature that the original tree trunk was carved into by its builder (MHM).

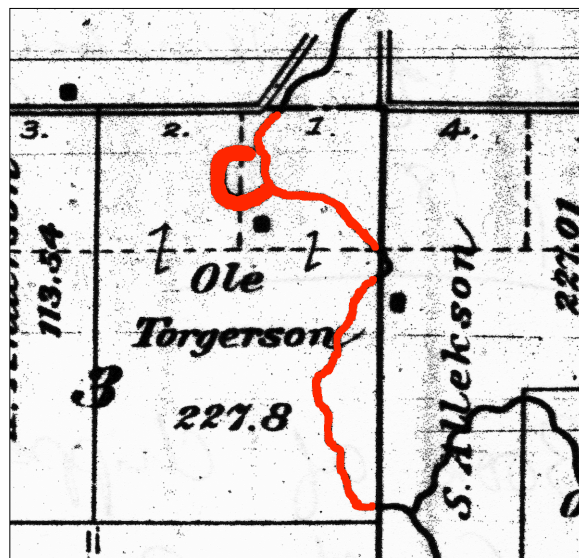
### **3. Chippewa River Dugout Canoe Chippewa County Historical Society 85.3.1, Montevideo**

The Chippewa River Dugout Canoe (CRDC) was discovered in 1867 or 1868 by Ole Torgerson in the section of the Chippewa River that ran through his farm in west central



Chippewa County. It is unclear whether the CRDC was in the river or covered in soil on the riverbank. Mr. Torgerson stored the artifact until 1878 when the development of an oxbow forced him to move to the west side of the river south of the new oxbow lake. Mr. Torgerson placed the artifact in a newly constructed shed and it remained there until the 1960s, more than four decades after Mr. Torgerson's death in 1918. Relative Lyle Torgeson<sup>3</sup> moved the CRDC from its resting place of over 80 years, the shed now part of an abandoned farmstead, and place it into another shed where it remained for nearly 25 years. Upon Lyle's death, the CRDC was purchased by the Chippewa County Historical Society (CCHS) for its collection in 1985 (Olson 1982; CRDC Accession File).

Ole Torgerson owned nearly 228 acres in Township 118 North, Range 41 West, Section 3 in west central Chippewa County. His land contained a portion of the Chippewa River, marked here in red. MHM cannot pin-point where Mr. Torgerson found the Chippewa River Dugout Canoe but it was somewhere in the river channel, including the oxbow cut-off (Northwest Publishing Company 1900, 18).



When MHM documented the CRDC 17 December 2013 with the assistance of MHM volunteer Kelly Nehowig, a sign accompanied it that read "This canoe was owned by Ole Torgerson. He built it from a cottonwood tree". Regardless of this information, MHM documented, measured, and took a small wood sample from the CRDC. It is 12.2 feet long, 1.74 feet wide, has a .96 foot depth of hold, has a 'handle' inserted through one end, and a thwart was nailed onto the the other end to serve as a seat or back support. These two attributes support the suggestion that Mr. Torgerson built the canoe during his lifetime. However, the calendar date of the CRDC's construction is AD 1436-1522 (400±30 BP), indicating it is from the Late Prehistoric Period and is supported by information recently gathered by the CCHS (CRDC Accession File). The artifact displays numerous tool marks throughout the inner hull, left behind by the stone implements used to carve out the tree. MHM contends that even though the craft is a canoe, it seems to have a bow and stern, with one end pointed and the other rounded. Whether the artifact's maker intended each end to serve specifically as a bow or stern is unknown. The CRDC is stable and in excellent condition and considering its post-river recovery existence stored in uncontrolled environments. What MHM considers the bow is cracked, however, and the 'handle' has been bored through the cracked portion. To maintain the health of the artifact, MHM suggests the canoe be placed in an environment with humidity controls. The canoe's Chippewa River provenience in west central Chippewa County places the artifact in the Prairie Lake Region and possibly the

<sup>3</sup>At some point the family name of Torgerson changed for some members to Torgeson and while it seems Ole Torgerson did not officially change the spelling of his name, his gravestone does reflect the change.

Plains Village Tradition, a supposition based on its geographic position and age (Anfinson 1997, 119, 121; Holley and Michlovic 2013, 5-7, 34). MHM contends that the 'stern thwart' (attached to the artifact with wire nails from the 20<sup>th</sup> Century) and possibly the 'bow handle' were attached to the CRDC by Mr. Torgerson or his relatives.



Above: The 'bow' end of the CRDC has a 'handle' inserted into a hole bored through the hull (MHM).

Inset: Wood sample collected for radiocarbon testing (Beta Analytic).

Right Top: Another view of the 'bow' end with the 'handle' (MHM).

Right Bottom: The 'stern' end of the CRDC that has a 'thwart' attached at the gunwale (MHM).



The 'stern thwart' is attached to the rounded hull with wire nails and is an obvious 20<sup>th</sup> Century addition to the artifact. Note the tool marks on the bottom of the hull (MHM).



The 'bow' end of the CRDC was carved to a point and is thicker than the hull's sides. Note the tool marks on the bottom of the hull (MHM).



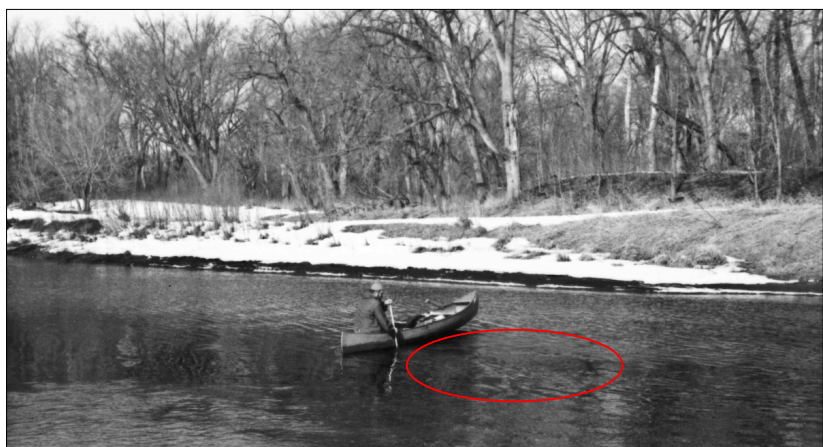
#### 4. Minnesota River Dugout Canoe (21-CP-72) Chippewa County Historical Society 1998-0483, Montevideo

In February 1982 Minnesota River canoe paddlers Doug Pederson and Wendell Peterson noticed the pointed end of a dugout canoe protruding from the shallow water in the river channel. This section of the river was not frozen, even in February, probably due to its position south of the Churchill Dam. In mid-July 1982, Pederson and Peterson returned to the site and with the help of Lon Redel and Brad Rasmussen, removed the Minnesota River Dugout Canoe (MRDC) from the sandy bottom. They tied the artifact with ropes in order to keep its shape and transferred it to Pederson's garage. At that time they contacted the MNHS and on the advice of the society's personnel, kept the artifact wet (*American-News* 1982). Questions of MRDC's ownership rightly were raised when authorities from the MNHS and the OSA studied the artifact in August 1982. Firstly, the archaeologists stressed the fact that legally, removal of an archaeological resource from state-owned land such as the bottom of the Minnesota River required an OSA-issued license, as well as appropriate training and credentials. Therefore, the MRDC was a state-owned artifact that was illegally removed from state land. However, the OSA allowed the Chippewa County Historical Society's Pioneer Village to accession the MRDC into its collection while the OSA and MNHS archaeologists oversaw the PEG conservation treatment of the artifact (Wanke 1982).

The red X marks the Minnesota River Dugout Canoe site as told to MHM by Lon Redel, Doug Pederson, and Brad Rasmussen. The site is in Township 118 North, Range 42 West, Section 24 (USGS 1958b).



This image was taken in February 1982 on the day the MRDC was located south of Churchill Dam. This photograph was taken from the west bank of the Minnesota River in Lac Qui Parle County looking east toward Chippewa County. The red circle indicates the position of the dugout canoe (courtesy of Doug Pederson).

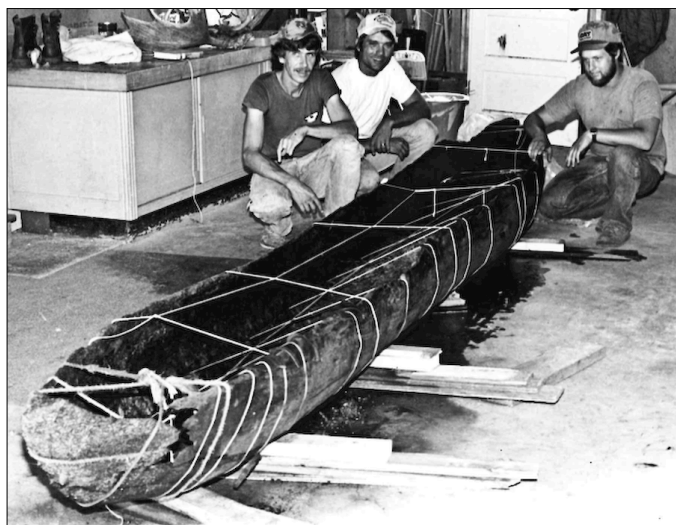




Digging out the MRDC from the river (MRDC Accession File).



The MRDC came out of the Minnesota River in pieces (MRDC Accession File).



Left: Doug Pederson, Lon Redel, and Brad Rasmussen after they transported the canoe from the Minnesota River (MRDC Accession File).

Right: Preparing the MRDC for immersion in PEG (MRDC Accession File).

MHM documented the MRDC 17 December 2013 with the assistance of MHM volunteer Kelly Nehowig. The artifact is 14.75 feet long, 1.75 feet wide, amidships it has an 11.5-inch depth of hold, and a small wood sample was taken. The MRDC has two distinct pointed ends, indicating that either end could serve as the bow or stern, although one end is a bit wider, suggesting a stern. The canoe has significant cracks along its sides and bottom but as it rests in a support cradle, it is stable. Sections of the artifact are being held to each other with wooden dowels inserted into the broken ends. Tool marks are evident throughout the inner hull. MHM examined the wood's consistency and it does appear that the interior of the artifact is soft in places. The artifact may have not dried properly after the PEG treatment during the conservation process or its vitrine is not allowing for controlled humidity. In regards to the MRDC's age, the wood sample has a calendar age of AD 1626-1679 ( $250 \pm 30$  BP), placing it in the Protohistoric to Early Historic Periods, spanning what is considered the pre-contact and early post-European contact era. It is probable that the MRDC is of the late Mississippian Culture, but without supporting diagnostic artifacts this is a supposition based on its age. Geographically the MRDC is in the Prairie Lake Region of study (Holley and Michlovic 2013, 5-6; Johnson 1988, 25). MHM sent images of the canoe's tool marks to MAS President and flint knapper Rod Johnson. He conducted a brief experiment for MHM and used a stone tool he fashioned out of chert and achieved very similar results to the marks on the MRDC (Rod Johnson, personal communication, 26 March 2014). Mr. Johnson's efforts suggest that while the canoe may have been constructed in the Early Historic Period, it was probably created using stone tools as opposed to metal implements. Lon Redel, Doug Pederson, and Brad Rasmussen assisted MHM in pin-pointing the precise location where the MRDC was removed from the river and photographic evidence supports their assertions. MHM submitted an archaeological site form to the OSA in late March 2014 and received a site number (21-CP-72) for the MRDC's original location at that time.



Above: One end of the MRDC is cracked and open, but still comes to a point (by Kelly Nehowig).

Left: This end of the MRDC is cracked but not broken apart. The craft's point is still intact (MHM)

Right: The wood sample taken from the MRDC for radiocarbon testing (Beta Analytic).







Both ends of the MRDC show the artifact is in pieces (by Kelly Nehowig).



The different pieces of the dugout are held together by dowels inserted into the ends of the sections (by Kelly Nehowig).

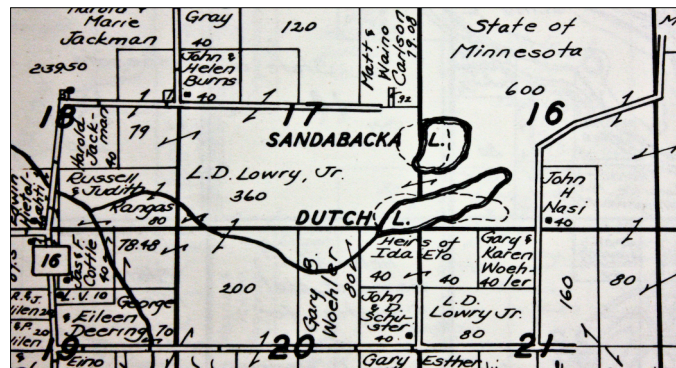


Stone tool marks are clearly evident in the inner hull of the MRDC (MHM).

### 5. C. Maki Dugout Canoe (21-AK-bs), Cokato Museum 76.4, Cokato

The C. Maki Dugout Canoe (C.MDC) was found by fisherman Chester Maki in 1973 in Aitkin County's Dutch Lake. Mr. Maki owned a cabin near the lake and while fishing, noticed what he thought was a burned log in shallow water in the weeds. Upon getting close to the object, he realized it was a dugout canoe and pulled the artifact from the lake. He dried out the C.MDC and in 1976 donated it to the Cokato Museum. During a 2009 Native American artifact inventory project, Dassel Area Historical Society volunteers compiled historical data about the C.MDC and completed a site form for it with the assistance of the OSA. Since the artifact's exact location in Dutch Lake could not be ascertained, the C.MDC was given an 'alpha designation' (21-AK-bs) by the OSA in 2009 (Munter and Koenen 2009; Munter and Ruotsinoja 2009).

Dutch Lake is in Salo Township, southwest of McGregor in Aitkin, Township 47 North, Range 22 West, Sections 16, 17, and 20. It is apparent that the lake's shoreline has changed over time as indicated by the dotted lines (Rockford Map Publishers 1972, 37).





MHM documented and took a small wood sample from the C.MDC on 22 December 2013. The artifact is 13.65 feet long, 1.56 feet wide, has a .58-inch depth of hold amidships, and the canoe's sides are mostly deteriorated. Regardless of the incomplete nature of the C.MDC, MHM contends it had two pointed ends and it is in stable condition, apparently drying out slowly enough not to cause an excessive amount of wood cell shrinkage. The small wood sample taken from the C.MDC has a calendar age of AD 1770-1830 ( $150 \pm 30$  BP). This date range and the artifact's location in Aitkin County supports MHM's supposition, with no diagnostic artifacts associated with the C.MDC for comparison, that the canoe was made by people of the Ojibwa culture during the European Contact Period (Blegen 1963, 21-23).

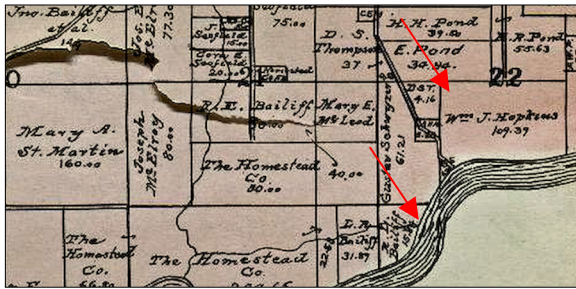


The C. Maki Dugout Canoe on exhibit at the Cokato Museum (MHM).  
Inset: The wood sample collected from the C.MDC for radiocarbon testing (Beta Analytic).

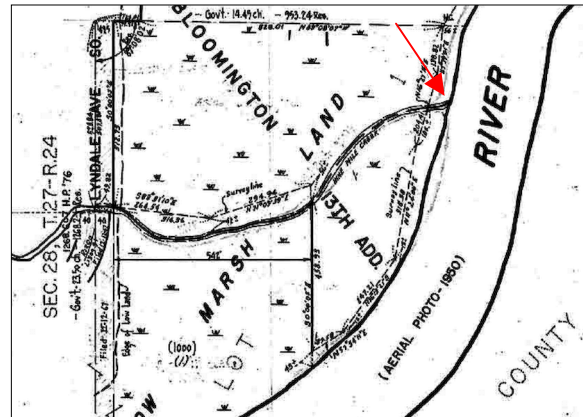
## 6. Minnesota River Valley Dugout Canoe Bloomington Historical Society 64-1, Bloomington

Bloomington farmer George Hopkins found the Minnesota River Valley Dugout Canoe (MRVDC) sometime between 1966 and 1968, with reports that the year was specifically 1967. Reportedly the artifact was "sticking out horizontally from the river bank a few feet from the bluff" in the Minnesota River Valley, indicating the water channel was either at a low phase or had shifted. However, part of the MRVDC museum display referred to its location as being "found in dry creek bed on hopkins [sic] farm east of lyndale [sic] ave [sic]". The Hopkins farm was located on the east side of Lyndale Avenue, but the location of the artifact may not have been part of the farm's land. During periods of increased precipitation or during a snow melt, a fork of Nine Mile Creek still flows under and to the east of Lyndale Ave and acts as drainage into the Minnesota River. If the MRVDC was imbedded in this creek bed's bank or in a section of the river that had dried up, it may have been on Federal or City-owned land when found, but this cannot be confirmed (Plat Systems Services 1961). The MRVDC was taken to the Bloomington Historical Society (BHS). The artifact was treated with applied layers of PEG while it sat in a bed of sand in the basement of the BHS. MHM contends that this treatment would not be entirely effective, since the standard treatment for waterlogged wood using PEG is prolonged submersion in the liquid with ever increasing concentrations of PEG to water, and then slowly drying the artifact in a humidity chamber. Since the PEG would

need to impregnate the artifact's wood cells, the bottom of the MRVDC would not have been affected since it was lying in sand. The artifact was on exhibit at the BHS until 2007. At that time the wood's consistency was described as "spongy", and the MRVDC underwent Acryloid B72<sup>4</sup> conservation treatment for stabilization and it was cleaned of sand. The MRVDC was placed on exhibit at the BHS at the conclusion of the artifact's conservation in November 2010 (MRVDC 64-1 Accession File; Smetanka 2010).



Above: The Hopkins farm and mouth of Nine Mile Creek in 1913 (Hennepin Atlas and Publishing Company). Right: The mouth of Nine Mile Creek (Plat Systems Services 1961).



MHM documented and took a small wood sample from the MRVDC on 11 January 2014. The artifact is 12.55 feet long, is 2.45 feet wide, and has a .59-foot depth of hold. Both ends of the canoe are deteriorated so its bow and stern configurations cannot be determined. The sides of the MRVDC are also deteriorated and the artifact is stable, but its position on the museum's floor in an uncontrolled environment is a cause for concern, particularly since people can sit down or step on it. The artifact has a calendar age of AD 1790-1850 (130±30 BP). Based on the artifact's original location in the Minnesota River Valley in Bloomington and its date range of creation, MHM contends the MRVDC was made and used by the Dakota people during the European Contact Period with a brief over-lap in the post-Contact Period (Gibbon 2003, 2-3, 56).

The Minnesota River Valley Dugout Canoe on exhibit at the Bloomington Historical Society (MHM).



The wood sample taken from the MRVDC (Beta Analytic).



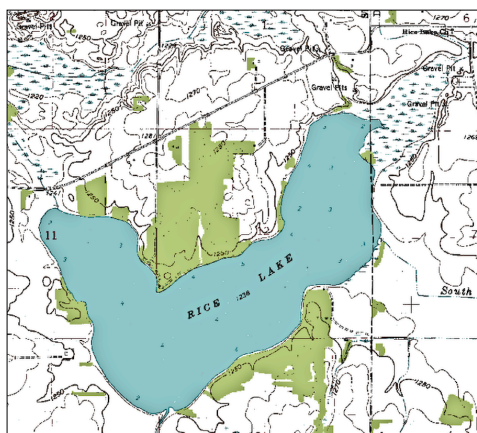
<sup>4</sup>Acryloid B72 is a polymer used to consolidate and stabilize fragile wood.



## 7. Rice Lake Dugout Canoe

### Dodge County Historical Society 90.23.1, Mantorville

The details of the discovery of the dugout canoe held by the Dodge County Historical Society (DCHS) are unknown. However, accession information from the DCHS indicates it was found in Rice Lake. Rice Lake is located in the easternmost portion of Dodge County and the westernmost portion of Steele County. It is unknown who found the Rice Lake Dugout Canoe (RLDC), but it was transferred to the farm of Lester Gripp in Dodge County and from there, it was given to Harley Linder, then to Lil Cartwright, and then to Jerry and Judy Sowieja. The Sowiejas donated the artifact to the DCHS in early 1990 (Ballard 1990; RLDC 90.23.1 Accession File). MHM documented and took a small wood sample from the RLDC on 27 December 2013. The artifact is 12.67 feet long, has a 1.6 foot beam, and since its sides are missing, it has no depth of hold but the bottom thickness is .29 inches. Regardless of the fragmentary nature of the artifact, there is enough material to conclude that both ends of the canoe were pointed and had a hard chine.<sup>5</sup> There are large tool marks evident throughout the inside bottom of the hull that are not smoothed out. This may indicate that the artifact was not used enough during its working life to 'smooth-out' from use. The RLDC is in stable condition and a small wood sample taken from the canoe has a calendar age of AD 1790-1850 (130±30 BP). This time span coupled with the probable Rice Lake provenience indicates the RLDC was constructed by the Dakota people during the European Contact Period with a brief over-lap in the post-Contact Period (Gibbon 2003, 2-3, 56).



Rice Lake, along with a substantial amount of swamp land that drains into it lies mostly in Steele County. However, the eastern edge of the lake and a significant swamp on its northeastern shoreline lie in Dodge County. MHM cannot determine in what county or section of the lake the Rice Lake Dugout Canoe was found (USGS 1962).

The wood sample taken from the RLDC for radiocarbon testing (Beta Analytic).



The Rice Lake Dugout Canoe on exhibit at the Dodge County Historical Society (MHM).

<sup>5</sup>A chine is the point where the hull sides and bottom of a watercraft meet.





One end of the RLDC can be investigate from both sides. The pointed nature of the dugout is apparent along with evidene of scuffs and tool marks (MHM).



The other end of the RLDC is also pointed and has survived a bit more intact (MHM).

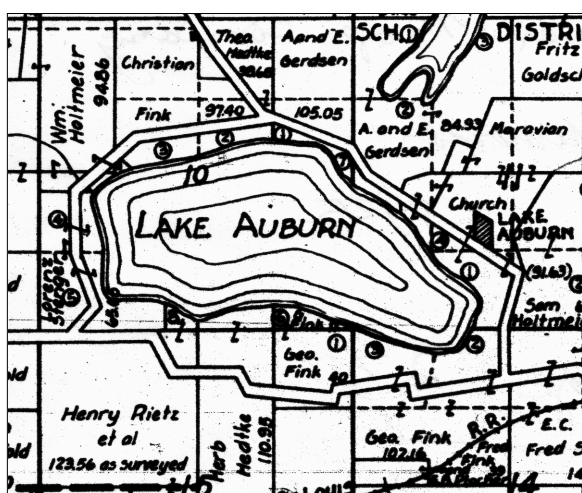


Along the bottom of the inside hull, tool marks are visible throughout, giving the artiact a rough appearance (MHM).

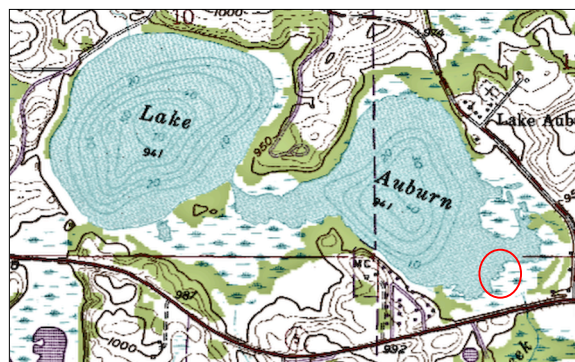
## 8. Lake Auburn Dugout Canoe Minnesota Historical Society #9827, St. Paul

The accounts surrounding the discovery of the Lake Auburn Dugout Canoe (LADC) vary depending on the recollections of the people involved. Contemporary reports intially claimed the LADC was discovered on 21 May 1933 but it was revealed that the canoe was spotted in the autumn of 1932. Henry Fink owned the land near where he, Charles Shonka, and Jack Shonka saw the "tip of the craft protruding from the swampy ground next to the lake". According to this account, the three men returned to the site within a few weeks to remove the LADC and at that time recognized it as a dugout canoe. Mr. Fink contended that the LADC had been pushed to the surface of the swamp by frost. He also claimed to have found another wrecked boat and other artifacts such as barrel staves, curved pieces of wood, and one burned pointed wooden object. Mr. Fink believed that he had located an accident scene that might have involved the other small boat and the LADC. Speculation about how the canoe found its way to Lake Auburn included theories that the craft came from around Lake Minnetonka or traveled up the Mississippi River and was portaged to the small lake. Other speculation concerned the LADC's age and theories took into account the 50 years the Fink family had owned their land, as well as how it might have been carved with a stone tool. A date of 75 years old was suggested but the supposition that a stone tool was used to fashion the canoe suggests earlier Native American origins. Yet an 'expert', a local judge, contended it was fashioned by people of European origin because of the tools

used and the fact that it could still be used on the lake if necessary. Furthermore, one newspaper reported that Henry's father George Fink owned the land on the lake and found the LADC, but he died in 1929 (*Find A Grave* 2012a, 2012b; *Minnetonka Record* 1933; *Weekly Valley Herald* 1933a, 1933b). However, another version of the LADC's discovery was given five decades later in the reminiscences of Marjorie Shonka Kuschill to her daughter. Marjorie was a child in charge of rowing the fishing boat for her dad Jack Shonka and her Uncle Charlie on Lower Lake Auburn, where both men rented cabins from Henry Fink. One of the fishing lines "caught on something protruding from the water...the line was caught on a round, pointed object". Marjorie's dad and uncle told Mr. Fink about their discovery and according to her, "some time passed before it was finally removed from the rushes, where it was buried except for the pointed ends" (Kuschill 1984).



This 1925 plat map of the Lake Auburn area in Carver County displays the large sections of land owned by Henry Fink's father George. This land transferred to Henry after his father's death (Hudson Map Company 1925, 23).



In the latter 20<sup>th</sup> Century, the central portion of Lake Auburn is swampy and shallow, separating the water into two sections. The approximate location where the LADC was pulled from the lake is circled in red (USGS 1958a).



The Lake Auburn Dugout Canoe was removed from this site in the marsh on the east side of the lake during low water. The distance of open water from the canoe's location upholds the version of the object's discovery by Mr. Fink and the Shonka brothers, not that of Marjorie (OSA Dugout Canoe File, digitized by MHM).





The LADC after it was removed from Lake Auburn, resting on Henry Fink's land. Tools marks are visible on the outer hull (MNHS HE5.19p18, digitized by MHM).

The inner hull of the LADC and its thick gunwales are clearly seen here. One end can be described as pointed (closer to the camera) while the other is more rounded (OSA Dugout Canoe File, digitized by MHM).



Regardless of the actual story surrounding the removal of the LADC from Lake Auburn, an attempt to sell it makes the story more interesting. A man named John Pewters of St. Paul made an effort on behalf of Henry Fink to sell the LADC to Henry Ford for his newly-developed museum in Dearborn, MI. Mr. Pewters described Lake Auburn and the canoe, and cited representatives of the MNHS and the UM as to its age and condition. Mr. Pewters also advised Mr. Fink not to accept less than \$500.00 for the dugout canoe because if Mr. Ford wanted the object, "he will pay that much, and it is worth it for his kind of a collection, and he certainly can afford that price...if Ford dont [sic] come through we can then get some other wealthy people interested, many of whom buy things of that sort and then turn around and donate them to museums and get their name placed thereon as the donors". Mr. Pewters consigned wood samples from the LADC to the Minnesota Department of Forestry and the United States Division of Forestry for identification. The Minnesota sample was routed to the Division of Forestry in the Department of Agriculture at the University of Minnesota. Both samples tested at the labs were identified as red oak. Henry Ford did not purchase the LADC but it was exhibited by the MAS at the 1934 Sportsman's Show as a "prime attraction", at the Walker Art Gallery, and Dayton's department store. Mr. Fink continued to store the LADC on his farm and traveled to different towns to exhibit it. In July 1960, after Henry

Fink's death, his niece donated the LADC to the MNHS and it was accessioned as #9827 (Klammerer 1934-1935, 88-89; LADC #9827 Accession File; Morrow 2001, 5; Paul 1933; Pewters 1933a-d; Rees 1933; *St. Paul Dispatch* 1960; Woolworth 1960).

MHM documented and took a small wood sample from the LADC on 10 January 2014 at the MNHS. The canoe is stored on a high shelf, so measurements of it were not possible, but when found it was reported to be 16 feet long, 26 inches wide, with a 16 inch depth of hold (*Minnetonka Record* 1933). The LADC is complete, with intact sides and tool marks evident throughout. The wood sample taken from the LADC has a calendar age of AD 1920-1933 ( $0 \pm 30$  BP), obviously indicating that the dugout canoe was fashioned by a person from the Lake Auburn area near the time it was found. Without more evidence, MHM will not make suppositions as to who constructed the LADC, who placed it into the lake, or why they did so. Contemporary accounts stressed that the Fink family had owned the land for over 50 years but had never noticed the dugout in the swamp during that time. MHM contends the canoe classifies as a forgery and at best, a replica. It is not an artifact. The intent of its maker was to deceive anyone who found the craft into perceiving it to be artifactual and constructed by Native Americans. However, considering its age, it is now an antique and is a European American's 20<sup>th</sup> Century interpretation of the appearance of a Native American dugout canoe.



The Lake Auburn Dugout Canoe is stored at the MNHS on a high shelf along with other canoes. Dan Cagley (pictured) of the MNHS assisted MHM in reaching the watercraft to take a sample and photographs by using a hydraulic lift (MHM).





The LADC is in good condition and is in safe storage. These photographs clearly show the tool marks visible on the object in the 1933 photographs (MHM).

The wood sample collected from the LADC for radiocarbon testing (Beta Analytic).



An artist's watercolor rendering of dugout canoe construction (Klammerer 1934-1935, 88).

## Conclusions

Going forward, MHM is optimistic that in the future, any dugout canoes located by Minnesotans in our lakes and rivers will be left *in situ* and not disturbed. Through the promotion of the results of this project, MHM is confident that the finders of these maritime cultural resources will contact the OSA and report the artifact's location in order for nautical archaeologists to document them properly. A precedent for this action occurred in 1969 with the discovery of a dugout in Twin Lakes in the Rice Lake National Wildlife Refuge in Aitkin County. The finders of the artifact could not properly care for the canoe and rightly placed it back in the lake, burying it under silt. Unfortunately the dugout canoe's 'new' location was not recorded (US Fish and Wildlife Service nd; Walt Ford, personal communication, 5 February 2014). Through research, MHM was able to locate the LMNADC and the MRDC sites and acquire archaeological site numbers for them<sup>6</sup>; this is a positive step toward placing the artifacts into their proper provenience and providing context to the information gathered about them. Accomplishing this feat for all of Minnesota's dugout canoes, those found in the past and in the future, would greatly enhance the maritime historical and nautical archaeological information gathered about these rare artifacts.

Remarkably, with only seven Native American dugout canoe examples studied so far, they come from five cultures, five time periods spanning nearly 1,000 years, and five geographic areas. MHM was able to determine the exact locations where two of the dugout canoes were pulled from their submerged sites and as a result, Minnesota archaeological site numbers were acquired for them through the OSA. The two oldest canoes, the LMNADC and BSDC, have carved ends that are bluff (rounded) with a soft chine. Further, the 1934 photograph of the LMNADC indicates that it probably had a definite bow and stern that are suggestive of the next oldest canoe, the CRDC. The current condition of the LMNADC does not reflect this similarity, but it appears that one end of the inner hull was wider and more bluff, like the CRDC. The CRDC's ends exhibit what could be called partially-hard chines – not hard (sharp) but not rounded – a kind of intermediate form. The design of this canoe clearly suggests a bluff and wider stern coupled with a defined pointed bow. Moving on to the next oldest dugout, the MRDC, both its pointed ends are similar to the bow of the CRDC, although the ends are carved more thinly resulting in a lighter canoe. However, the MRDC does not exhibit a hard chine at either end, and this attribute is suggestive of the construction of the LMNADC and the BSDC. The bow design of the CRDC – pointed with a defined somewhat hard chine – would allow the watercraft to move more swiftly through water since there was less drag from the submerged section of the bow. The fact that this trait was not incorporated into the MRDC is interesting, with one explanation being that its maker was less-skilled than the CRDC's maker. Unfortunately, the ends of the C.MDC and the MRVDC have not survived and cannot be analyzed. The newest dugout canoe, the RLDC, clearly incorporates hard chines on both ends. While either end could be used as the bow or stern, one end is a bit broader, suggesting the stern. The RLDC would have moved swiftly through the water with less drag than the other examples. MHM is eager to document more dugout canoes and place them temporally, stylistically, and

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<sup>6</sup>MHM also submitted site form updates to the OSA regarding the BSDC, whose original site has an archaeological site number, and the C.MDC, whose original site has an alpha designation number.



geographically into the system just established through the comparison of the seven examples discussed here.

The ability to determine the probable age ranges for the dugout canoes documented during this study enabled MHM to begin a database of these artifacts and their characteristics. The age of the artifacts, the attributes they exhibit, the geographic locations where they were discovered, and their condition further our knowledge about the people who constructed and used this early form of Minnesota waterborne transportation. The age ranges of the dugout canoes, AD 1025-1933, encompass nearly the last 1,000 years of Minnesota's maritime history. Tool marks on both prehistoric and historic canoes are tangible remnants of the actual production process, and their geographic locations indicate the cultural background of their creators depending on their age. The information accumulated during this project builds upon itself and the attributes recorded from each dugout canoe provides starting points for future artifact studies.

### **Recommendations**

MHM recommends the continued study of dugout canoes throughout Minnesota as they are located. Seven prehistoric and historic dugout canoe examples documented during this project (the questionable nature and calendar age of the LADC prohibits its inclusion in the same category as the other canoes) presents a small sample. Documenting and radiocarbon testing this group of artifacts is a good beginning, but more research must be conducted. During this project MHM confirmed the existence of three more dugout canoes with Minnesota origins already removed from lakes or rivers. One artifact is in Beltrami County (Dan Karalus, personal communication, 21 February 2014), one is in Blue Earth County (Jessica Potter, personal communication, 14 January 2014), and the Harold Warp Pioneer Village in Nebraska holds one with Wright County provenience (Monica, Harold Warp Pioneer Village Foundation, personal communication, 8 March 2014). MHM would also consider taking another wood sample from the LADC to confirm the 'modern' date of the watercraft.

MHM has located references to other Minnesota dugout canoes, including two from Lake Traverse (OSA Dugout Canoe File), one from Winsted Lake (Aulwes et al 2013, 40; Scherer 2011), and one from the Mississippi River in the flour mill district of Minneapolis (*St. Paul Globe* 6.13.1890; *Weekly Northwestern Miller* 6.20.1890). The existence of these artifacts is in question, as they might have been destroyed through neglect. MHM supports the relocation of the dugout canoe in Twin Lakes with the knowledge that any work conducted in the Rice Lake National Wildlife Refuge requires a Federal permit and permission. To find the canoe in Twin Lakes, MHM may have to use sonar or a sub-bottom profiler in addition to SCUBA. MHM does not advocate removing the dugout canoe from Twin Lakes, but an *in situ* documentation and sample collection for radiocarbon dating is warranted. Removing the artifact from the lake would require a detailed research plan acceptable to the US Fish and Wildlife Service and the Rice Lake National Wildlife Refuge, funds to use an appropriate conservation facility and proper treatment with PEG, and a storage or display venue must agree to accept the canoe into their collection prior to its excavation.

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